Hay Storage Facility Construction Guidelines
University of Tennessee

(Current as of 11-28-06)

1. *Site Location and Preparation for Construction*

   Proper site location and building orientation are the first step in construction of hay storage facilities. The structure should be located on a well drained site. Grading may be required to divert water away from the structure on all sides.

   Prevailing winds usually dictate the orientation of the structure on the site. The open end of the structure should face away from prevailing winds if the structure will have walls on one or more sides. Three sides with walls and one open side are recommended. Prevailing winds in Tennessee are usually from the west or southwest. If one side is enclosed, it should be the west end of the structure. If two sides are installed, they should be on the west and south side. If three sides are installed, the open side should face away from prevailing winds, usually the east end.

   Adequate space should be provided around the structure for turning and movement of hay handling equipment.

2. *Structure sizing and height*

   The size of the structure will be determined by the size and number of bales to be stored. Space should be left along the inside walls of the structure to allow air movement for moisture migration from bales.

   Cattle producers with 30 head will require 90 round bales for an average winter. The 90 bales will require a barn 30 x 30 with a minimum height of 16 feet. A producer with 60 head would require 180 round bales for an average winter. This barn would need to be 30 x 60 with a minimum height of 16 feet.

   Four-foot diameter bales stacked three high will require an inside clearance height of 14-15 feet to allow for use of machinery in stacking bales. Five-foot diameter bales will require 17-18 feet and six- foot diameter bales will require 19-20 feet of height.

   Larger producers with large numbers of bales to store may consider using more than one storage structure to lower risk of fire losses in one large structure. Multiple structures also permit better management of feeding operations when all cattle are not located in one location.

   Pole barn structures are acceptable, with or without sides. One or more sides on windward side will reduce hay losses from wind blown rain.

3. *Structure construction*

The structure should be constructed of materials that will not deteriorate rapidly when exposed to elements of weather. Treated lumber, cedar, locust and similar wood will last 15-20 years on average. Metal structures should be painted or coated with rust resistant coatings.

Pole type structures should have concrete bases under the posts, especially if walls will be attached to the poles. A six-inch thick base twice the diameter of the posts will support roof and side wall loads adequately.

Roofs should be constructed of metal, shingles, or polymer coated fabrics. Roof trusses should be designed to meet local building codes for snow load and wind load. In west and middle Tennessee (Nashville and west) snow loads of eight (8) pounds per square foot is recommended. Cumberland Plateau and lower east Tennessee snow loads of 10 pounds per square foot are recommended. Upper east Tennessee snow loads of 12 pounds per square foot are recommended.

Flooring of concrete or 4-6 inches of crushed stone are recommended. A double layer of 6 mil polyethylene plastic film or one layer of 6 mil plastic topped with a layer of geo-textile fabric will prevent crushed stone from puncturing plastic and creating holes for moisture migration into hay. A concrete or crushed stone base is highly recommended if machinery will be operated on the floor of the storage facility.

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